REMARKS

The Applicants note that claims 41-45 are indicated as being allowed in the Office Action Summary.

Claims 24-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyazono, *et al.* (United States Patent Number 5,912,867). Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hideyasu (Japan Publication Number 2000348354) in view of Hashimoto, *et al.* (United States Patent Number 4,328,579). Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hideyasu in view of Katayama, *et al.* (Japan Publication Number 10-055546). Claims 15-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hideyasu in view of Applicant Admitted Prior Art (AAPA). Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hideyasu, in view of Katayama, *et al.*, and further in view of Ishibashi, *et al.*(United States Patent Number 5,848,036). Claim 13 is cancelled above. In view of the amendments to the claims and the following remarks, the rejections are respectfully traversed, and reconsideration of the rejections is respectfully requested.

In the present invention as claimed in claim 24, a focus search method includes receiving a focus OK signal and determining a logic state of the focus OK signal and generating waveforms for a focus search having different slopes based on the result of the determination of the logic state of the focus OK signal.

In the present invention as claimed in claims 25-26, a focus search method includes receiving a focus OK signal and, if the focus OK signal is logic "low," generating a waveform for the focus search having a first slope, and if the focus OK signal is logic "high," generating a waveform having a second slope.

Miyazono, *et al.* discloses, in FIGs. 7 and 8(a) to 8(d), upon the start of a focus search operation, a system controller 11 turns on a switch SW_1 to open a focusing servo loop and turns off a switch SW_2 for initialization in step F101 in a time period Δt_1. In step Fl02, a switch SW_3 is turned on to supply an up-search current for a time period Δt_2 for an initial up-search operation. Then, in step F103, the system controller 11 turns off the switch SW_3, turns on SW_4 to supply a down-search current for a down-search time Δt_d. If the focus acquisition enable operation is completed successfully (time t_4 in FIG. 8(a)), the focus search operation is terminated. The FOK signal is in the low state during the focus search and enters the high state at time t_4 when the focus search is terminated. In FIGs. 9(a) to 9(d) of Miyazono, *et al.*, the focus search is not completed successfully at time T_4. Between times T_4 and T_{20}, the focus search is stopped. At time T_{20}, the focus search operation starts again and is successfully completed at time T_{21}. The FOK signal is always low during the focus search operation, for example, before time T_4 and between T_{20} and T_{21}.

Miyazono, *et al.* fails to teach or suggest a focus search method which includes receiving a focus search OK signal and determining a logic state of the focus OK signal and generating waveforms for a focus search having different slopes based on the determination result, as claimed in claim 24. Instead, in Miyazono, *et al.*, whenever the focus search operation is being executed, the FOK signal is in a logic low state. Therefore, there is no effect on the slope of the waveform for the focus search based on whether it is high or low, because the FOK signal is always in a logic low during the focus search.

Miyazono, *et al.* further fails to teach or suggest a focus search method which includes receiving a focus OK signal and, if the focus OK signal is logic "low," generating a waveform for the focus search having a first slope, and if the focus OK signal is logic "high," generating a waveform having a second slope, as claimed in claims 25-26. Instead, in Miyazono, *et al.*, the waveform for the focus search is not generated when the FOK signal is logic "high."

Miyazono, *et al.* fails to teach or suggest certain elements of the invention set forth in claims 24 and 25-26 as discussed above. Therefore, it is believed that the amended claims are allowable over the cited reference, and reconsideration of the rejections of claims 24-26 under U.S.C. 102(b) as being anticipated by Miyazono, *et al.*, is respectfully requested.

In the present invention as claimed in claims 1-3, a focus search method includes generating a sine wave in response to a focus search command and performing a focus search by an optical pickup outputting a focus error signal in response to the sine wave. The sine wave is generated independently of the focus error signal. The sine wave is digitally generated from an impulse signal by using a plurality of multipliers, a plurality of adders and a plurality of delay units.

In the present invention as claimed in claims 4-6, a focus search method includes generating a sine wave and performing a focus search using an optical pickup that outputs a focus error signal and ascends or descends toward or from an optical disc in response to an amplitude of the sine wave. The sine wave is generated independently of the focus error signal. The sine wave is digitally generated from an impulse signal by using a plurality of multipliers, a plurality of adders and a plurality of delay units.

In the present invention as claimed in claims 7 and 8, a focus search method includes performing a focus search using an optical pickup that outputs a focus error signal and that ascends and descends toward or from an optical disc in response to an amplitude of a sine wave generated by a sine wave generator. The sine wave is generated independently of the focus error signal. The sine wave is digitally generated from an impulse signal by using a plurality of multipliers, a plurality of adders and a plurality of delay units.

Hideyasu discloses a method in which a focus servo pull-in is executed around the center of oscillation of an objective lens. In Hideyasu, a switch SW2 is changed over to a compensation circuit 11 from a sine wave generating circuit 12 in response to a signal from a pull-in control circuit 21. The pull-in control circuit 21 generates focus error zero-cross signal in response to a focus error signal from a focus error detecting circuit 14 and an RF signal which is the total reflected light obtained by a reflected light detecting circuit 15. The compensation circuit 11 receives the focus error signal from the focus error detecting circuit. The pull-in control circuit 21 includes a pulse period detector 27. The pulse period detector 27 includes a low pass filter LPF.

The Office Action states at page 3 that Hideyasu does not disclose the sine wave is digitally generated from an impulse signal by using a plurality of multipliers, a plurality of adders and a plurality of delay units.

Therefore, Hideyasu fails to teach or suggest a focus search method in which a sine wave is digitally generated from an impulse signal by using a plurality of multipliers, a plurality of adders and a plurality of delay units, as claimed in claims 1-3, 4-6 and 7-8.

Hashimoto, *et al.* discloses a system which permits talking on a telephone simultaneously with transmission and reception of some other information using the same telephone circuitry. Utilizing the harmonics structure of the voice, an information signal A desired to be transmitted together with a voice signal E is represented by a signal having a spectrum separable from the voice spectrum and this signal is superimposed on the voice signal E for transmission. First and second sine-wave signals of first and second frequencies are frequency modulated by the same information signal A so that frequency variations of the sine-wave signals correspond to variations of the information signal A. The first and second sine-wave signals are disposed in different first and second predetermined frequency bands which do not overlap each other so that it does not coincide with the harmonic relation of the voice spectrum. As a consequence, at least one of the first and second sine-wave signals does not overlap the voice spectrum. To generate the information signal A to have a spectrum separable from the voice signal prior to superimposing the signal on the voice signal for transmission, analog signal A is applied to an analog-to-digital converter 13 for conversion into a digital signal B. The digital signal B is provided to a digital frequency modulator 14 to derive therefrom, as modulated outputs, frequency-modulated sine-wave signals. The digital frequency modulator 14 includes digital sine-wave generators 15 and 17. The outputs of the digital sine-wave generators 15 and 17 are added together in an adder 18. The added output is applied to a digital-to-analog converter 19 for conversion into an analog signal D. The analog signal D is superimposed on voice signal E for transmission.

Hashimoto, *et al.* fails to teach or suggest a focus search method in which a sine wave is digitally generated from an impulse signal by using a plurality of multipliers, a plurality of adders and a plurality of delay units, as claimed in claims 1-3, 4-6 and 7-8. Instead, Hashimoto, *et al.* discloses that the sine-wave generator 15 for generating a sine wave based on the digital signal B. There is no teaching or suggestion that the digital signal is an impulse signal as claimed. Rather, the digital signal represents input information A to be transmitted with a voice signal. In addition, in the present invention, a sine wave is generated automatically when an impulse signal is inputted into a sine wave generator 440. However, in Hashimoto, *et al.*, the analog-to-digital converter 13 receives input information A and converts the input information A into a corresponding digital signal B. Then, the digital sine wave generators 15 and 17 generate first and second sine-wave signals that are frequency modulated by the input information A, and the digital-to-analog converter 19 converts the signals into an analog signal D. The system of Hashimoto, *et al.* requires the analog-to-digital converter 13 for generating the sine-wave signal. Therefore, in Hashimoto, *et al.*, the sine-wave signal is not generated automatically when the input information A is inputted. Further, in the present invention, the sine wave generator 440 is a genuine sine wave generator. However, in Hashimoto, the digital sine wave generator 15, is a frequency modulator for frequency modulating the first and second sine-wave signals of first and second frequencies by the same information signal A. Accordingly, Hashimoto, *et al.* cannot control a loop gain of tracking serve of a focusing servo automatically. In the present invention, however, loop gain of a tracking servo or a focusing servo can be automatically controlled by the sine wave generator 440 that automatically generates a sine wave.

Hence, neither of Hideyasu and Hashimoto, *et al.* teaches or suggests certain elements of the present invention set forth in claims 1-3, 4-6 and 7-8. Specifically, neither of Hideyasu and Hashimoto, *et al.* teaches or suggests a focus search method in which a sine wave is digitally generated from an impulse signal by using a plurality of multipliers, a plurality of adders and a plurality of delay units. Accordingly, there is no combination of the references which would provide such teaching or suggestion. Neither of the references, taken alone or in combination, teaches or suggests the invention set forth in claims 1-3, 4-6 and 7-8. Therefore, it is believed that claims 1-3, 4-6 and 7-8 are allowable over the cited references, and reconsideration of the rejections of claims 1-8 under 35 U.S.C. § 103(a) based on Hideyasu and Hashimoto, *et al.* is respectfully requested.

In the present invention as claimed in independent claim 15, a focus search method includes receiving, low-pass filtering, and outputting a signal output from a focus loop filter during a focus-on, and adding a waveform for a focus search and the low-pass filtered signal during the focus search, and wherein the focus search starts from the low-pass filtered signal.

In the present invention as claimed in claim 19, a focus search method includes driving an optical pickup in response to a signal output from a focus loop filter during a focus-on and, if a focus drop occurs after the focus-on and a focus search is performed again, performing the focus search from the signal output from the focus loop filter during the focus-on before the focus drop occurs using the optical pickup.

In the present invention as claimed in claim 20, a focus search method includes calculating an average value for the signal output from a focus loop filter during a focus-on and, if a focus drop occurs after the focus-on and a focus search is performed again, generating a waveform for the focus search and adding the waveform for the focus search and the average value.

With regard to independent claim 15, the Office Action states at page 6, paragraph 4, that Hideyasu does not disclose a focus search method comprising: receiving, low pass filtering, and outputting a signal from a focus loop filter during a focus-on, and adding a waveform for a focus search and the low-pass filtered signal during the focus search, wherein the focus search starts from the low-pass filtered signal. Therefore, it follows that Hideyasu fails to teach or suggest a focus search method that includes receiving, low-pass filtering, and outputting a signal from a focus loop filter during a focus-on, as claimed in claims 15-18. In addition, Hideyasu fails to teach or suggest a focus search method that includes adding a waveform for a focus search and a low-pass filtered signal during the focus search, as claimed in claims 15-18. In addition, Hideyasu fails to teach or suggest a focus search method that includes a focus search which starts from a low-pass filtered signal, as claimed in claims 15-18.

With regard to independent claim 19, Hideyasu fails to teach or suggest a focus search method that includes, if a focus drop occurs after a focus-on and a focus search is performed, performing the focus search from the signal output from the focus loop filter during the focus-on before the focus drop occurs using the optical pickup, as claimed in claim 19. Hideyasu does not teach or suggest the outcome if a focus search is unsuccessful. As stated in Amendment B, dated July 30, 2007, instead, in Hideyasu, there is no teaching or suggestion of a focus drop. Therefore, there is no teaching or suggestion in Hideyasu of performing the focus search from the signal output from the focus loop filter prior to the focus drop.

With regard to independent claim 20, Hideyasu fails to teach or suggest a focus search method that includes, if a focus drop occurs after a focus-on and a focus search is performed again, generating a waveform for the focus search and adding the waveform for the focus search and an average value for the signal output from a focus loop filter, as claimed in claim 20. Hideyasu does not teach or suggest the outcome if a focus search is unsuccessful. As stated in Amendment B, dated July 30, 2007, instead, in Hideyasu, there is no teaching or suggestion of a focus drop. Therefore, there is no teaching or suggestion in Hideyasu of performing the focus search from the signal output from the focus loop filter prior to the focus drop. In addition, in Hideyasu, the output of the waveform from FIG. 5B is in no way added to a waveform that is used for a focus search, as claimed. In addition, in Hideyasu, the sine wave signal generated by the sine wave generating circuit 12 is not added to any signal.

In the AAPA, a focus loop filter 30 receives a focus error signal FE output from the optical pickup 20 and outputs a focus output drive signal FOD for a focus servo to an actuator mounted in the optical pickup 20 in response to the focus error signal FE. In the AAPA, in an event that a focus drop occurs due to an external impact when performing a focus search, a focus search apparatus performs the focus search again from the start.

However, with regard to claims 15-18, like Hideyasu, the AAPA fails to teach or suggest a focus search method that includes receiving, low-pass filtering, and outputting a signal from a focus loop filter during a focus-on, as claimed in claims 15-18. Instead, in the AAPA, the output of the focus loop filter 30, focus output drive signal FOD, is output to an actuator mounted in the optical pickup 20. There is no teaching or suggestion the focus output drive signal FOD is low-pass filtered during a focus-on.

In addition, with regard to claims 15-18, like Hideyasu, the AAPA fails to teach or suggest a focus search method that includes adding a waveform for a focus search and a low-pass filtered signal during a focus search, as claimed in claims 15-18, since there is no teaching or suggestion in AAPA of a low-pass filtered signal. Therefore, the AAPA in no way teaches or suggests that a waveform for a focus search is added to a low-pass filtered signal.

In addition, with regard to claims 15-18, like Hideyasu, the AAPA fails to teach or suggest a focus search method that includes a focus search which starts from a low-pass filtered signal, as claimed in claims 15-18. Instead, in the AAPA, in an event that a focus drop occurs due to an external impact when performing a focus search, a focus search apparatus performs the focus search again from the start. In addition, as the AAPA does not disclose a low-pass filtered signal, the AAPA does not disclose starting a focus search from a low-pass filtered signal, as claimed.

With regard to independent claim 19, like Hideyasu, the AAPA fails to teach or suggest a focus search method that includes, if a focus drop occurs after a focus-on and a focus search is performed, performing the focus search from the signal output from the focus loop filter during the focus-on before the focus drop occurs using the optical pickup, as claimed in claim 19. In the AAPA, in an event that a focus drop occurs due to an external impact when performing a focus search, a focus search apparatus performs the focus search again from the start, without regard to any previous outputs of a the focus loop filter.

With regard to independent claim 20, like Hideyasu, the AAPA fails to teach or suggest a focus search method that includes, if a focus drop occurs after a focus-on and a focus search is performed again, generating a waveform for the focus search and adding the waveform for the focus search and an average value for the signal output from a focus loop filter, as claimed in claim 20. There is no teaching or suggestion in the AAPA that an average value of the focus output drive signal FOD output from the focus loop filter 30. In addition, there is no teaching or suggestion that any signal is added to the waveform for the focus search. Further, in the AAPA, in an event that a focus drop occurs due to an external impact when performing a focus search, a focus search apparatus performs the focus search again from the start, without regard to an average value of the output from the focus loop filter.

Hideyasu and the AAPA fail to teach or suggest elements of the invention set forth in claims 15-18, 19 and 20, as noted above. Specifically, neither of Hideyasu and the AAPA teaches or suggests a focus search method that includes receiving, low-pass filtering, and outputting a signal from a focus loop filter during a focus-on, adding a waveform for a focus search and a low-pass filtered signal during the focus search, a focus search which starts from a low-pass filtered signal, as claimed in claims 15-18. Accordingly, there is no combination of the references which would provide such teaching or suggestion. Neither of the references, taken alone or in combination, teaches or suggests the invention set forth in claims 15-18, 19 and 20. Therefore, it is believed that claims 15-18, 19 and 20 are allowable over the cited references, and reconsideration of the rejections of claims 15-17, 19 and 20 under 35 U.S.C. § 103(a) based on Hideyasu and the AAPA is respectfully requested.

With regard to the rejection of claim 18 based on the combination of Hideyasu, Katayama, *et al.*, and Ishibashi, *et al.*, it is submitted that Katayama, *et al.*, and Ishibashi, *et al.*, like Hideyasu, fail to teach or suggest a focus search method that includes receiving, low-pass filtering, and outputting a signal from a focus loop filter during a focus-on, as claimed in claims 15-18. In addition, Katayama, *et al.*, and Ishibashi, *et al.* fail to teach or suggest a focus search method that includes adding a waveform for a focus search and a low-pass filtered signal during the focus search, as claimed in claims 15-18. In addition, Katayama, *et al.*, and Ishibashi, *et al.* fail to teach or suggest a focus search method that includes a focus search which starts from a low-pass filtered signal, as claimed in claims 15-18.

Accordingly, there is no combination of the references which would provide such teaching or suggestion. None of the references, taken alone or in combination, teaches or suggests the invention set forth in claims 15-18. Therefore, it is believed that claims 15-18 are allowable over the combination of Hideyasu, Katayama, *et al.*, and Ishibashi, *et al.*, and reconsideration of the rejection of claim 18 under 35 U.S.C. § 103(a) based on Hideyasu, Katayama, *et al.*, and Ishibashi, *et al.* is respectfully requested.

In view of the foregoing remarks, it is believed that all claims pending in the application are in condition for allowance, and such allowance is respectfully solicited. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

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